

XVIII. REPORT ON A SMALL COLLECTION
OF FISH FROM PUTAO (HKAMTI LONG)
ON THE NORTHERN FRONTIER
OF BURMA.

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(With Plate XXII.)

The fish described or discussed in this paper were recently collected by Dr. Murray Stuart of the Geological Survey of India. The collection though small and not including any specimens of large size is of considerable interest. No fish has hitherto been reported from the extreme northern corner of Burma, and several interesting new forms are represented, the most remarkable of which is an undescribed species of the genus *Channa*, which, though known from both Ceylon and China, has not hitherto been discovered in the eastern parts of the Indian Empire.

In Dr. Stuart's collection there are altogether twenty-one specimens, all from mountain streams in the Putao Plains (Hkamti Long of the old maps) on the northern Frontier of Upper Burma. These plains are entirely separated by very high mountain ranges from the watersheds of the Brahmaputra system (including the Dihang and the Lohit) of the Assam and Tibetan Frontiers on the west and the Mekong system (Yunnan) on the east. The Sen-Ben-Ti, the Nam-Yak and the Nam-Ti-Sang mentioned in the text belong to the Irrawaddy system.

The twenty-one specimens examined belong to twelve species, which fall into eleven genera representing five different families. Except in three or four instances all the species, belonging to quite unrelated families, have developed some kind of adhesive or sucking apparatus—an interesting instance of convergence or plasticity in the formation of specialized organs of a similar nature in a restricted environment.

LIST OF SPECIES OBTAINED.

Sub-order OSTARIOPHYSI.

Division SILUROIDEA.

Family SISORIDAE.

Amblyceps murray-stuarti, Chaudhuri, sp. nov.

„ *mangois* (Hamilton Buchanan).

Erethistes asperus (M'Clelland).

Exostoma vinciguerrae, Regan.

Pseudecheneis sulcatus (M'Clelland).

Division CYPRINOIDEA.

Family COBITIDAE.

Aborichthys kempi, Chaudhuri.

Nemacheilus botia (Hamilton Buchanan).

Family CYPRINIDAE.

Sub-family CYPRININAE.

Semiplotus cirrhosus, Chaudhuri, sp. nov.

Barbus stoliczkanus, Day.

Sub-family RASBORINAE.

Danio aequipinnatus (M'Clelland).

Sub-order PERCESOCES.

Family OPHICEPHALIDAE.

Channa burmanica, Chaudhuri, sp. nov.

Sub-order ACANTHOPTERYGII.

Division PERCIFORMES.

Family NANDIDAE.

Badis badis (Hamilton Buchanan).

DESCRIPTION OF SPECIES.

Genus *Amblyceps*, Blyth.

Amblyceps murray-stuarti, sp. nov.

(Plate XXII, figs. 1, 1a, 1b.)

The family Sisoridae¹ consists of small cat-fishes found in swift mountain streams in Northern India, Burma, Tibet and China. In most of the genera (e.g. *Pseudecheneis*, etc.) a sucking-disk, made up of folds or plates of skin, is formed on the region of the chest. The disk enables these fishes to resist the force of the water. In some genera plates or lobes of skin about the mouth serve the purpose of a sucking organ. The following Indian genera are included in this family:—

Amblyceps, *Olyra*, *Akysis*, *Chimarrichthys*, *Exostoma*, *Parex-*

¹ Jordan, *A Guide to the Study of Fishes*, Vol. II, p. 184.

ostoma, *Erethistes*, *Glyptosternon*, *Euglyptosternum*, *Pseudecheneis* and *Sisor*.

The generic character "caudal fin being forked" of the genus *Amblyceps* has to be modified. The genus was originally founded on a single species (*A. mangois*) with a forked tail-fin. In the new species, however, as well as in *A. marginatus*, Günther,¹ from mountain streams running into the Min River, in the province of Sze-chuen, China, the caudal fin is square-cut. Nor is the generic character "no adhesive thoracic surface" strictly true of this new species as there appears to be about thirteen loose folds of skin over the posterior part of the chest continued to the anterior portion of the abdominal region. These folds are likely to possess some adhesive function. Instead of founding a new genus on these slight differences it is considered reasonable to extend the definition of *Amblyceps* so as to include these three closely related species in the genus, which the author very graphically alluded² to as "cobitis looking siluroid."

The head, which is depressed and is broader than high, slopes rapidly down to a spatulate snout. The dorsal profile is almost straight from the point of origin of the rayed dorsal fin, which is small and slender, to the anterior end of the low and long adipose dorsal fin; the ventral profile is, however, straight throughout. The body is broad and round from behind the head to the anal opening, posterior to which it is highly compressed. The eyes and the head are covered with soft skin; the eyes are very small and are placed in the anterior part of the head with two parts of its length in front and three parts behind, the interorbital distance being contained about five times in the length of the head. There are two nostrils on each side quite close to each other, the posterior one almost reaching the front of the eye and having a barbel attached to the front wall. The mouth is wide and anterior and the opening is horizontal, the upper jaw being slightly longer than the lower. The teeth on the jaws are villiform, arranged in the upper jaw in a broad crescentic band and in the lower jaw in a straight narrow band. The margins of the lips are slightly fringed in both.

There are altogether eight barbels. The maxillary barbels have flat and expanded roots with loose dilated flaps and are as long as the head. The nasal and the outer mandibular barbels are equal to each other, and are two-thirds the length of the head. The inner mandibular barbels are about half as long as the head.

The gill openings are wide and continue up to one-third of the depth of the body on the dorsal side all the way from the notch below the chin in the ventral aspect; the gill membranes from two sides unite in front of a slender gular plate-like structure at the middle point between the two roots of the outer mandibular

¹ Pratt, *To the Snows of Tibet Through China*, p. 245, pl. ii, fig. A.

² Blyth, *Proc. Asiat. Soc. Bengal*, XXVII, p. 282.

barbels. The number of branchiostegal rays is twelve; they are concealed under soft thick skin.

The pectoral and the pelvic fins are low, small and narrow, covered with soft skin. The pectoral fins, which are situated immediately behind the gill openings, are very low and are on a level with the ventral surface. The small pelvic fins are on the ventral surface and arise slightly anterior to and enclose the anal opening which is placed on a slightly raised cushion, the fins reaching beyond it. Immediately behind the cushion of the anal opening there is a deep fossa inside which is the slender anal papilla so common among the siluroids. At about the middle of the interval on the ventral surface, between the roots of the pectoral and pelvic fins, the loose skin appears to be folded into twelve or thirteen corrugations which may be considered as a rudimentary structure analogous to the adhesive disks found in some of the genera (e.g. *Pseudecheneis*, *Glyptosternon*, *Euglyptosternum*, etc.) belonging to this family. The pelvic fins reach beyond the fossa behind the anal opening, but do not reach the anal fin which is high and long. The caudal fin is flat and well spread out, but is sub-truncated. Some very short and compact fin-rays continue round the caudal peduncle to a slight extent along both the ventral and dorsal edges.

The colour in spirit is brownish-black above and lighter below. The maxillary barbels are white-tipped and the nasal and the inner mandibular barbels are dusky white.

The measurements of the specimen in hundredths of total length without the caudal fin are as follows:—

Length of body in millimeters	...	...	...	81
Depth of body expressed in hundredths of length	...	...	...	14.8
Depth of caudal peduncle	"	"	"	13.5
Length of head	"	"	"	18.5
Depth of head at occiput	"	"	"	10
Width of head	"	"	"	13.5
Width of interorbital space	"	"	"	5
Length of snout	"	"	"	6
Distance from end of snout to dorsal fin	"	"	"	22
Distance from end of snout to root of pectoral fin	"	"	"	17.3
Distance from end of snout to root of pelvic fin in hundredths of length	...	...	...	44.5
Distance from end of snout to anterior root of anal fin in hundredths of length	...	...	...	63
Distance from last anal ray to root of caudal fin in hundredths of length	...	...	...	22
Height of longest dorsal ray in hundredths of length	...	...	...	11
Height of longest anal ray	"	"	"	11
Length of caudal fin	"	"	"	14.8
Length of pectoral fin	"	"	"	12.3
Length of pelvic fin	"	"	"	7.4
Length of adipose fin	"	"	"	31.2
Depth of adipose fin	"	"	"	4
Base of anal fin	"	"	"	18.5
Number of rays in dorsal fin	...	...	...	15
Number of rays in anal fin	...	...	...	13
Number of rays in pectoral fin	...	...	...	17
Number of rays in pelvic fin	...	...	...	7
Number of long rays in caudal fin	...	...	...	20

The single spines of the dorsal and of the pelvic fins are round, smooth and hyaline, but that of the pectoral fin is flat and striated.

The species superficially resembles *Amblyceps marginatus* Günther, collected by Mr. Pratt in mountain streams running into the Min River in the province of Sze-chuen in China, but it differs in possessing a shorter head, in being of a lesser depth, in having the upper jaw longer instead of shorter than the lower jaw, in having a longer adipose dorsal and shorter barbels, in having corrugated folds of skin on the ventral side, and also in the position of the fins and in proportions. The colouration is also different; in particular the new species does not possess the broad whitish border round the margins of all the fins. It resembles *A. marginatus* in having a subtruncated caudal, and a short pelvic fin not reaching the anal. The widely distributed Indian species *Amblyceps mangois* (H.B.)—hitherto the sole representative of the genus in the continent of India—differs from the new species in having a prominent lower jaw, a divided caudal fin, longer barbels with non-dilated roots, a smooth ventral surface, a shorter and higher adipose fin and in the number of fin-rays as well as in proportions.

The type specimen is 81 mm. in length without the caudal fin and is entered in the register of the Zoological Survey of India under No. 9736/1. It was collected by Dr. Murray-Stuart of the Geological Survey of India from a mountain stream in the Putao Plains on the northern Frontier of Upper Burma in the month of February, 1918.

***Amblyceps mangois* (Hamilton Buchanan).**

- 1822. *Pimelodus mangois*, Hamilton Buchanan, *Fish. Ganges*, pp. 199 and 379.
- 1842. *Pimelodus anisurus*, McClelland, *Calcutta Journ. Nat. Hist. Art Sci.*, II, p. 583.
- 1842. *Pimelodus indicus*, *Id.*, *ibid.*, p. 584.
- 1853. *Pimelodus mangois*, Bleeker, *Verh. Batavia Gen.*, XXV, p. 58.
- 1858. *Amblyceps caecutiens*, Blyth, *Proc. Asiat. Soc. Bengal*, XXVII, p. 282.
- 1860. *Amblyceps tenuispenis*, *Id.*, *ibid.*, XXIX, p. 153.
- 1864. *Amblyceps caecutiens*, Günther, *Cat. Fish. Brit. Mus.*, V, p. 190.
- 1864. *Amblyceps tenuispenis*, *Id.*, *ibid.*
- 1864. *Amblyceps mangois*, *Id.*, *ibid.*
- 1869. *Amblyceps mangois*, Day, *Proc. Zool. Soc.*, p. 524.
- 1871. *Akysis kurzii*, Day, *ibid.*, p. 704.
- 1877. *The Mangoi*, Hamilton Buchanan, *Stat. Act. Bengal*, XX, p. 60.
- 1877. *Amblyceps mangois*, Day, *Fish. Ind.*, p. 490, pl. cii, fig. 6, and pl. cxvii, fig. 1.
- 1889. *Amblyceps mangois*, *Id.*, *Faun. Brit. Ind. Fish.*, I, p. 123, fig. 52.
- 1890. *Amblyceps mangois*, Vinciguerra, *Ann. Mus. civ. Stor. Nat. Genova* (ser. 2), IX, p. 196.
- 1893. *Amblyceps mangois*, Boulenger, *Ann. Mag. Nat. Hist.*, (ser. 6), XII, p. 200.
- 1913. *Amblyceps mangois*, Chaudhuri, *Rec. Ind. Mus.*, VIII, p. 252.

Two figures, one in outline from above and the other a side view in colour, are in existence on plate ix of Hamilton Buchanan's

Manuscript Drawings¹ now in the possession of the Asiatic Society of Bengal. The name "*Pimelodes Manggoi*" appears on the back of this plate in Hamilton Buchanan's handwriting. Subsequently he said of this very fish, "The Mangoi is a small very ugly Pimelode"² in his manuscript reports on the statistical enquiry of Bengal districts in which he was engaged from 1807 to 1813. As the type of his *P. mangois* has been lost, or at least cannot be traced, and as the description in the *Fishes of the Ganges* is not illustrated, this manuscript drawing is of additional value, as it is the protograph of the species. The type specimens were found in tanks in Northern Bihar and also probably in the R. Kusi near Nathpur.

There are only two specimens in the collection. They measure 41 mm. and 38 mm. in length. Both were secured from hill streams in the Putao Plains.

Distribution.—Fresh waters of India and Burma usually on or near the hills, including the Himalayas from Kangra to Darjiling, Ludhiana, the Jumna (for some considerable distance from the hills), Bihar districts, a stream south of Yembung (Abor country), Nampanet (Southern Shan States), Pegu and Moulmein; also the Cabul River at Jellalabad.

Genus **Erethistes**, Muller and Troschel.

Erethistes asperus (M'Clelland).

(Plate XXII, figs. 2, 2a, 2b).

1844. *Pimelodus asperus*, M'Clelland, *Calcutta Journ. Nat. Hist. Art. Sci.*, IV, p. 404, pl. xxiv, fig. 2.

1864. *Hara aspera*, Günther, *Cat. Fish. Brit. Mus.*, V, p. 189.

1873. *Hara aspera*, Bleeker, *Ned. Tijdschr. Dierk.*, IV, p. 125.

It was Günther who first pointed out that the genus was allied to *Sisor*.³ The original description of the species by M'Clelland is very defective, and his figures even more so. M'Clelland also miscalculated the number of barbels, mentioning only six in place of eight, probably disregarding the nasal barbels which are not very conspicuous. Günther's corrections and additions, though not of great importance, enable one to recognize the species. Any attempt at redescription, however, should be postponed till specimens can be obtained from the neighbourhood of Chusan. M'Clelland also made a mistake in assigning this freshwater fish to estuaries.⁴ The species has not been found previously within Indian limits.

Two specimens were obtained from Tanja, measuring 33 mm. and 31 mm. respectively. The smaller one is, however, damaged. Three figures of the larger specimen are supplied and the actual

¹ Chaudhuri, *Mem. Ind. Mus.*, V, p. 444 and foot-note.

² Hunter, *A Statistical Account of Bengal*, XX, p. 60.

³ Günther, *Cat. Fish. Brit. Mus.*, V, p. 293.

⁴ M'Clelland, *Calcutta Journ. Nat. Hist. Art. Sci.*, IV, p. 395.

measurements of both specimens are given below for reference. The mouth is inferior. The lip is lobate and reflected and spreads continuously round the mouth so as to form a broad flat sucker. The teeth in the jaws are villiform in broad bands. The bases of the maxillary barbels are dilated; the mandibular barbels are short, round and thick, the surface of these barbels being studded with closely set tubules. The posterior nostril is slit-like, while the anterior one is round and terminates in a funnel-like structure. There are four or five bony tubercles in a horizontal line on each side near the gill-opening below the dorsal spine. The chest is coriaceous with slight corrugations. The body is dark brown in colour, with two white broad transverse stripes made up of white blotches. The anterior band is at the end of the dorsal fin, and the posterior one nearer to the root of the caudal. The pectoral and the pelvic fins are grey marked with black blotches; the caudal fin is greyish-brown. The maxillary barbels are annulated in white and brown while the mandibular barbels are white.

Measurements of specimens :—

Total length (without caudal fin) in millimeters	...	33	31
Length of head including opercular flap	"	10	10
Depth of body	"	10	9
Depth of caudal peduncle	"	4	3.5
Length of snout	"	6	5.5
Depth of head at occiput	"	6	6
Width of head	"	8.5	8
Width of interorbital space	"	4	3.5
From tip of snout to anterior limit of dorsal fin	"	10	10
Height of dorsal spine	"	6	5
" of longest dorsal ray	"	8	8
Length of pectoral fin	"	11	10
" of pelvic fin	"	6	6
Base of anal fin	"	4.5	4.5
Height of anal fin	"	6	6
From tip of snout to root of pectoral fin	"	8	8
From tip of snout to root of pelvic fin	"	18	17
From tip of snout to anterior end of anal fin	"	22	22
From tip of snout to anal opening	"	21	21
Number of rays in the dorsal fin	...	11.5	11.5
" " " pectoral fin	...	1.7	1.7
" " " pelvic fin	...	8	8
" " " anal fin	...	1.9	1.9

Distribution.—Upper Burma (N. Frontier); China (Chusan).

Genus *Exostoma*, Blyth.

Exostoma vinciguerrae, Regan.

1890. *Exostoma labiatum* (non McClelland), Vinciguerra, *Ann. Mus. civ. Stor. Nat. Genova* (ser. 2), IX, p. 252.
 1905. *Exostoma vinciguerrae*, Regan, *Ann. Mag. Nat. Hist.* (ser. 7), XV, p. 184.

There are two specimens in the collection, one measuring 56 mm., from the Putao Plains and another measuring 45 mm. from the Nam-Yak river at Tanja. The smaller specimen is damaged and distorted. From the measurements, etc. of the bigger specimen

it appears to be *Exostoma vinciguerrae*, a species (a single specimen) which was first collected by the late Leonardo Fea in the Khakhyen (Kachin) Hills, Upper Burma, but was wrongly identified by Vinciguerra as *E. labiatum* (M'Clelland). Vinciguerra mistakenly thought that it extended the distribution of *E. labiatum*, which was known only from Upper Assam (Mishmi). The type of M'Clelland's *E. labiatum* is in the British Museum (Griffith's collection).

In both the specimens the under surface of the flat spines of the pectoral and pelvic fins is finely striated, suggesting adhesive properties.

Distribution.—Upper Burma: Khakhyen Hills and Putao Plains.

Genus *Pseudecheneis*, Blyth.

Pseudecheneis sulcatus (M'Clelland).

1842. *Glyptosternon sulcatus*, M'Clelland, *Calcutta Journ. Nat. Hist.*, II, p. 587, pl. vi, figs. 1, 2 and 3.
 1860. *Pseudecheneis sulcatus*, Blyth, *Proc. Asiat. Soc. Bengal*, p. 134.
 1864. *Pseudecheneis sulcatus*, Günther, *Cat. Fish. Brit. Mus.*, III, p. 264.
 1877. *Pseudecheneis sulcatus*, Day, *Fish. Ind.*, p. 500, pl. cxvi, fig. 1.
 1889. *Pseudecheneis sulcatus*, *Id.*, *Faun. Brit. Ind. Fish.*, I, p. 107, fig. 44.
 1890. *Pseudecheneis sulcatus*, Vinciguerra, *Ann. Mus. Civ. Stor. Nat. Genova* (ser. 2), IX, p. 252.
 1913. *Pseudecheneis sulcatus*, Chaudhuri, *Rec. Ind. Mus.*, VIII, p. 255.

There is one specimen from the Putao Plains measuring 93 mm. in length without the caudal fin. The barbels on the ventral side are short and thick and their surface is broken up into tubules. The lips are lobulated and expanded with a suctorial mouth. The spines of the pectoral and the pelvic fins are flat and expanded and are covered with thick skin. The under surface of these flat spines is finely striated, converting these fins also into an additional adhesive apparatus. The conspicuous adhesive disk on the chest is oval and is made up of sixteen thick and broad transverse folds with a broad margin; posterior to this apparatus the skin over the anterior portion of the abdomen is loose and corrugated in finer folds. The gill-opening is not entirely confined to the dorsal side as in *Exostoma*, but continues just a little on the ventral surface to the border of the transverse folds.

Distribution.—Darjeeling; Khasi Hills; Yembung (Abor country); and Khakhyen (Kachin) Hills, Upper Burma.

Genus *Aborichthys*, Chaudhuri.

Aborichthys kempí, Chaudhuri.

1913. *Aborichthys kempí*, Chaudhuri, *Rec. Ind. Mus.*, VIII, p. 245, pl. vii, figs. 1, 1a and 1b,

There are two specimens in the collection, measuring 82 mm. and 80 mm. in length, obtained from hill streams near Tanja. The two specimens differ slightly from one another and from the

type in colouration and some other particulars. The ground colour of the body of the longer fish is greyish-white. The obliquely transverse dark bands anterior to the dorsal fin are very narrow, but those below the fin are broader and posterior to the dorsal fin the stripes are replaced by irregular blotches. The ocellus at the upper corner of the root of the caudal fin is intensely black. The colour of the two limiting bands of alternate black and white round the free border of the caudal fin is somewhat diffused. In the smaller specimen the colour of the upper side of the head is not marbled, as is usually the case in the species, but is of a uniform dark brown, and the ground colour of the body is dirty brown to black. There are no transverse stripes on the sides in front of the dorsal fin. Below the dorsal fin and in front of the pelvic fins there are some dark but faint transverse stripes, very narrow and of diffused colouration. There are no transverse stripes behind the dorsal fin. The caudal fin has two bright white bands, both broad, one at the root and the other just interior to the terminal black band round the free end of the fin. The ocellus at the upper corner of the root of the caudal fin is just as in the longer fish. The dorsal fins in both the specimens bear three black bands made up of black dots. This fish may belong to a distinct race if not a new species.

Distribution.—Egar stream, between Renging and Rotung, the Dihang River near Yembung and the Sirpo River near Renging in the Abor country; mountain streams in the Garo Hills, Assam; and similar streams near Tanja, Putao, in Upper Burma.

Genus *Nemacheilus*, Hasselt.

Nemacheilus botia (Hamilton Buchanan).

- 1822. *Cobitis botia*, Hamilton Buchanan, *Acct. Fish. Ganges*, pp. 350, 394.
- 1822. *Cobitis bilturio*, *Id.*, *ibid.*, pp. 358 and 395.
- 1846. *Cobitis bilturio*, Cuvier and Valenciennes, *Hist. Nat. Poiss.*, XVIII, p. 35.
- 1846. *Cobitis botia*, *Id.*, *ibid.*, p. 72.
- 1839. *Cobitis bimucronata*, McClelland, *Asiat. Researches*, XIX, pp. 304 and 433, pl. li, fig. 4.
- 1839. *Cobitis scaturigina*, *Id.*, *ibid.*, pp. 308 and 443, pl. liii, fig. 6.
- 1839. *Cobitis ocellata*, *Id.*, *ibid.*, p. 436, pl. li, fig. 6.
- 1839. *Somileptes unispina*, Swainson, *Lardner's Cab. Cyclop. Nat. Hist. (Fish. Amph. Rep.)*, II, p. 311.
- 1841. *Cobites moorei*, Sykes, *Trans. Zool. Soc.*, II, p. 366.
- 1853. *Cobitis botia*, Bleeker, *Verh. Bat. Gen.*, XXV, p. 70.
- 1853. *Cobitis bilturio*, *Id.*, *ibid.*
- 1863. *Cobitis botia*, Bleeker, *Versl. Akad. Amsterdam*, XV, p. 42.
- 1868. *Nemacheilus urophthalmus*, Günther, *Cat. Fish. Brit. Mus.*, VII, p. 348.
- 1868. *Nemacheilus botia*, *Id.*, *ibid.*, p. 349.
- 1869. *Nemacheilus botia*, Day, *Proc. Zool. Soc.*, p. 382.
- 1877. *Nemacheilus botia*, Day, *Fish. Ind.*, p. 614, pl. clvi, fig. 5.
- 1877. *Nemacheilus aureus* (var.), *Id.*, *ibid.*, p. 614, pl. clvi, fig. 4.
- 1889. *Nemacheilus botius*, *Id.*, *Faun. Brit. India, Fish.*, I, p. 227.
- 1893. *Nemacheilus botia*, Boulenger, *Ann. Mag. Nat. Hist.* (ser. 6), XII, p. 203.
- 1918. *Nemacheilus botia*, Annandale, *Rec. Ind. Mus.*, XIV, p. 35.

There is only one specimen measuring 72 mm. in length without the caudal fin, collected from a stream near Tanja. The preorbital has no projection wholly free and movable nor is it entirely concealed by the skin, but there is a narrow concave slit or groove just underneath it, commencing from below the middle of the eye and reaching to about the middle of the snout. The eyes are in the middle of the head and the anterior root of the dorsal fin is equidistant from the tip of the snout and the root of the caudal fin. The distance of the vent from the snout is sixty-one in hundredths of its length without the caudal fin. The caudal fin is almost square-cut and slightly emarginate. The ground colour of the body is dull grey or dirty white with fourteen broken-up transverse bands of dark brown above the lateral line and seven or eight wedge-shaped transverse markings below it, alternating with the bands above. There are four transverse dark brown bands on the caudal fin instead of five, and these bands are rather wavy and not at all oblique or > shaped as is usual in the species. It approaches nearer to the variety *N. aureus*, Day than to the typical form. M'Clelland's figures, viz. figs. 4 and 6 of plate li and fig. 6 of plate liii, are only imperfect reproductions of three figures in plates numbered 49, 50 and 53 of the manuscript drawings of Hamilton Buchanan.¹ These figures are labelled *Cobitis bilturi*, *Cobitis botya*, and *Cobitis scaturigina* in Buchanan's handwriting. The name on plate 53 of the collection of MSS. drawings in the possession of Asiatic Society of Bengal, however, has been inadvertently cut off by the binder. Günther considered *N. scaturigina* to be a doubtful species of the genus.²

Distribution.—Punjab; Sind; Poona; Madras, as far south as the R. Kistna; Orissa; Bihar; Bengal; Assam; Burma, Southern Shan States and North-Eastern frontier; Ceylon.

Genus *Semiplotus*, Bleeker.

Semiplotus cirrhosus, Chaudhuri, sp. n.

(Plate XXII, figs. 3, 3a.)

Bleeker, who founded the genus *Semiplotus* on a single Assamese species, *Cyprinus semiplotus*, M'Clelland, attributed to the genus among several other characters the possession of a knob at the symphysis and the absence of barbels. The new species, however, has two maxillary barbels and is without any knob at the symphysis of the lower jaw. In all other respects it so very naturally fits into the genus that it would be going against all sound principles not to include it. The practice of multiplying the number of genera should, as far as possible, be discouraged, as it only makes the path of systematic study unnecessarily difficult.

¹ Chaudhuri, *Mem. Ind. Mus.*, V, p. 444 (foot-note).

² Günther, *Cat. Fish. Brit. Mus.*, VII, p. 347.

The fish is broad and deep with a round belly and thick head. The dorsal profile is highly convex: from the anterior root of the dorsal fin it suddenly slopes towards the snout, which is broad, blunt and moderately round and thick; the posterior portion of the dorsal profile runs in a more gentle curve to the caudal peduncle where, about the middle of the peduncle, it is slightly concave. Beyond this the curvature is again convex to the upper corner of the root of the caudal fin. The ventral profile, with its lowest point at the root of the pelvic fin, nearly corresponds to the curvature of the dorsal profile but with less abruptness in the frontal portion from the root of the pelvic fin towards the lower jaw. The curvature from this point is still less convex than the dorsal profile, towards the caudal peduncle.

The mouth is terminal and inferior, and its opening is wide; the upper jaw is thick and deep with a movable upper lip; the lower jaw is extremely thin with a horny or cartilaginous plate with a little prominence in the middle. On the broad and obtuse snout there is a row of open pores four in number, two on each side. The maxillary extends nearly to below the front of the eye and there are two maxillary barbels. On each side below the preorbital there is a narrow slit. The eye is nearly in the middle of the head and the diameter of the orbit is contained nearly three times in the length of the head. The latter is contained three and two-third times in the total length without the caudal fin. The length of the barbel is equal to that of the snout, which is slightly less than the length of the orbit. The gill openings are almost restricted to the sides and the gill membranes are confluent with the skin of the isthmus; the surface underneath the lower jaw and below the neck from the chin to the isthmus appears to be in part corrugated; immediately below the lower jaw it is somewhat fleshy and spongy probably with adhesive function.

The height (the greatest depth at the anterior root of the dorsal fin) is contained two and four-fifth times in the total length without the caudal fin and the least depth of the caudal peduncle is contained nearly seven times in that length.

The anterior end of the dorsal fin, though nearly equidistant from the tip of the snout and the root of the caudal fin, is slightly nearer to the snout. There are thirteen scales in front of the dorsal fin and ten between the last ray at its posterior end and the root of the caudal fin. There are three spines, all entire, and twenty-five branched and divided rays. The length of the longest dorsal ray is contained about four times in the total length. The distance between the tip of the snout and the superior root of the pectoral fin is contained three and a half times and the length of the fin about four times; there are altogether fifteen rays in the fin which almost reaches the root of that of the pelvic.

The tip of the snout and the root of the caudal fin are nearly equidistant from the root of the pelvic fin which has nine rays; the length of the rays is contained five times in the total length

and they reach as far as the vent; the ends of these rays are soft, thin, slender and almost silky. The anal fin has two spines and nine rays and there are seven scales between the last anal ray and the root of the caudal fin; the height of the anal fin is contained seven times in the total length. The caudal fin is deeply lobed and contains twenty long rays; the length of the longest rays of the borders is contained three times and that of the short middle rays seven times in the total length; the lobes of the caudal fin are equal.

The scales are fairly large and are nondeciduous. There are thirty-three perforated scales in the lateral line, which is complete and runs concave to the dorsal profile from the gill opening to below the end of the dorsal fin and thence straight about the middle of the fish to the root of the caudal fin. Below the anterior root of the dorsal fin there are seven transverse rows of scales above the lateral line and five transverse rows between the lateral line and the mid-ventral line. There are four rows of scales between the lateral line and the pelvic fin. The number of scales round the narrowest part of the caudal peduncle is eleven.

Measurements in hundredths of total length without caudal fin :—

Depth of body	...	...	...	36.5
Depth of caudal peduncle	...	...	...	14.3
Length of head	...	...	...	26.8
Depth of head	...	...	...	24.6
Width of head	...	...	...	17
Length of snout	...	...	...	7.3
Diameter of orbit	...	...	...	9.7
Width of interorbital space	...	...	...	12.2
Width of mouth	...	...	...	12.2
Length of maxillary	...	...	...	7.3
Length of barbel	...	...	...	7.3
Distance from tip of snout to anterior root of dorsal fin	...	...	...	48.78
Height of longest dorsal rays	...	...	...	24.6
Distance from tip of snout to root of pectoral fin	...	...	...	29.27
Length of pectoral fin	...	...	...	24.6
Distance from tip of snout to root of pelvic fin	...	...	...	51.2
Length of pelvic fin	...	...	...	19.5
Distance from tip of snout to vent	...	...	...	68.3
Distance from tip of snout to anterior root of anal fin	...	...	...	73.2
Height of longest anal rays	...	...	...	17
Length of caudal peduncle	...	...	...	17
Width of root of caudal fin	...	...	...	18
Length of longest rays of caudal fin	...	...	...	34.1
Length of shortest middle rays of divided caudal fin	...	...	...	14.6
Total length without caudal fin in mm.	...	...	...	41

The colour of the body of the fish in spirit is steel blue, but lighter in the belly. The upper edge of the orbit is black and the dorsal edge and the upper side of the head are dark; the fins are dull white with dark edges.

There are only two other species belonging to the genus: *S. semiplotus* (McClelland) from Assam and Burma and *S. modestus*, Day, from the hill ranges near Akyab. The new species differs considerably from both of them in possessing barbels, and in not being provided with a knob at the symphysis of the lower jaw—two characters which originally were thought to be of generic im-

portance as already noticed. The species agrees with *S. semiplotus* in having the last osseous spine smooth and entire, and differs in this respect from *S. modestus*, in which the last spine is serrated; on the other hand it agrees with the latter in having the lateral line concave to the dorsal profile and not almost straight as in *S. semiplotus*. It has on the snout a row of pores like *S. semiplotus*, but the number of pores is four in place of eight in *S. semiplotus*. There are differences in proportion and colouration also. Both the previously known species are denizens of hilly tracts, though examples of *S. semiplotus* have been found as far down as Goalpara in the valley of the Brahmaputra. Griffith, however, observes that smaller examples of *S. semiplotus* are usually found near rapids. The adhesive apparatus below the chin, and further posteriorly down to the isthmus, is very interesting and significant of the habits of the new species if not of the genus.

There is only one specimen, the holotype, collected by Dr. Murray Stuart in February 1918, from a hill stream in the Putao Plains (Hkamti Long of the old maps), Upper Burma. It is entered in the register of the Zoological Survey of India under No. 9747/1.

Genus *Barbus*, Cuvier.

Barbus stoliczkanus, Day.

1869. *Barbus m'clellandi*, Day, *Proc. Zool. Soc.*, p. 619.
 1871. *Barbus* (Puntiuz) *stoliczkanus*, Id., *Journ. Asiat. Soc. Bengal*, XL, p. 328.
 1877. *Barbus stoliczkanus*, Id., *Fish. India*, p. 577, pl. cxliv, fig. 8.
 1889. *Barbus stoliczkanus*, Id., *Faun. Brit. Ind. Fish.*, p. 326.
 1893. *Barbus stoliczkanus*, Boulenger, *Ann. Mag. Nat. Hist.* (ser. 6), XII, p. 202.
 1918. *Barbus stoliczkanus*, Annandale, *Rec. Ind. Mus.*, XIV, p. 35.

There is only one specimen measuring 38 mm. collected in a hill stream near Tanja. The anal fin is rolled on itself and looks like a tuft at the free-end. The colouration is very well preserved.

The first name cited above is preoccupied.¹

Distribution.—Burma (Pegu, Moulmein, Shan States and Putao Plains).

Genus *Danio*, Hamilton Buchanan.

Danio aequipinnatus (M'Clelland).

1839. *Perilampus aequipinnatus*, M'Clelland, *Asiat. Researches*, XIX, p. 393, pl. lx, fig. 1.
 1853. *Leuciscus aequipinnatus*, Bleeker, *Verh. Bat. Gen.*, XXV, p. 66.
 1858. *Leuciscus lineolatus*, Blyth, *Journ. Asiat. Soc. Bengal*, p. 219.
 1860. *Perilampus affinis*, Id., *ibid.*, p. 163.
 1868. *Danio micronema*, Günther, *Cat. Fish. Brit. Mus.*, VII, p. 282.
 1868. *Pteropsarion aequipinnatus*, Id., *ibid.*, p. 285.
 1877. *Danio aequipinnatus*, Day, *Fish. Ind.*, p. 596, pl. cl, fig. 6.
 1889. *Danio aequipinnatus*, Id., *Faun. Brit. Ind., Fish.*, I, p. 356, fig. 111.
 1890. *Danio aequipinnatus*, Vinciguera, *Ann. Mus. Civic. Stor. Nat. Genova* (ser. 2), IX, p. 304.

¹ Cuvier and Valenciennes, *Hist. Nat. Poiss.*, XVI (1842), p. 390.

1893. *Danio aequipinnatus*, Boulenger, *Ann. Mag. Nat. Hist.* (ser. 6), XII, p. 203.
 1913. *Danio aequipinnatus*, Chaudhuri, *Rec. Ind. Mus.*, VIII, p. 252.
 1917. *Danio aequipinnatus*, Annandale, *Note on Fisheries Inlé Lake*, p. 3.
 1918. *Danio aequipinnatus*, Id., *Rec. Ind. Mus.*, XIV, pp. 35, 211.

There is only one specimen, from a hill stream in the Putao Plains, measuring 56 mm. There are a series of rows of small wart-like beads on and around the chin and below the neck. The body is more dusky than usual; the colour appears to have faded though some of the longitudinal stripes are conspicuous. There is a round white blotch on the upper anterior corner of the opercle.

Distribution.—The Himalayas (Darjiling); Assam (Garo Hills, Naga Hills, Sadiya, Yembung); Burma (Tenasserim, Shan States); Deccan; and Ceylon.

Genus *Channa*, Gronovius.

Channa burmanica, Chaudhuri, sp. n.

(Plate XXII, figs. 4, 4a, 4b).

The body is round in front but is very much compressed behind the vent, which is situated about the middle. The dorsal profile from the anterior root of the dorsal fin slopes gently to the snout. The ventral profile, which is more convex in the region of the lower jaw than the upper, continues parallel to the dorsal profile as far as the vent, behind which both profiles continue in a straight line but converge towards the caudal peduncle, about the middle of which there is a slight concavity in both.

The height of the body at the anterior end of the dorsal fin is contained six and a half times in the total length without the caudal fin, and the width at the same region six and one-fourth times; the height about the middle of the caudal peduncle is contained ten and a half times and the width at the same part twenty-six and a half times in the total length.

The head is wide and is greatly depressed; its length is contained nearly four times in the total length without the caudal fin. The depth at the occiput is eight times and the width of the head six and one-third times in the total length. The opening of the mouth continues behind the orbit; the length of the maxillary is contained ten and three-fifth times and the width of the mouth eight and five-sixth times in the total length. The eyes are placed far forward: the diameter of the orbit is equal to the length of the snout and is contained five and three-fifth times in the length of the head. The interorbital space is very flat and its width is twice as long as the length of the snout. There are two nasal tubes over the tip of the snout, slightly longer than half the diameter of the orbit. The gular plate is rather long and narrow, rounded in front and notched behind, its length being contained six and a half times in the total length and its breadth five times in the width of the head. Round the gular plate on the margin of the gill membranes, which continue close to the chin,

there is a series of openings of mucuous glands, the largest of which is far forward and is directly under the chin. The surface of the posterior portion of the gular plate has slight corrugations which may possess some adhesive function; in places on it, as well as on the edge of the gill membrane round it, there are coriaceous patches which probably help the fish to stick against the force of the current.

There are fifteen scales in front of the dorsal fin (*i.e.* from the snout to the anterior end of that fin), and six scales between the hind margin of the orbit and the pre-opercle; there are the same number of scales between the last ray of the dorsal fin and the root of the caudal. The number of rays in the dorsal fin is thirty-eight, none of which are divided; the height of the longest ray (which is the seventh from the last) is contained eight times in the total length. The distance between the tip of the snout and the root of the pectoral fin is contained three and a half times in the total length, and the length of the pectoral fin five times. The latter has twelve flat rays. The anal fin commences one scale behind the vent and has twenty-eight undivided rays; the seventh ray from behind being the highest—nearly as high as the highest ray in the dorsal fin. The length of the caudal peduncle is equal to its height; there are nine scales between the last ray of the anal and the root of the caudal and eighteen scales round the caudal peduncle. The caudal fin is fan-shaped and consists of twelve rays; the middle rays are the longest; their length is contained nearly six times in the total length and they are just twice as long as the height of the root of the caudal fin.

There are fifty-one scales in the lateral line of which fifty scales are perforated; the line bends down after twelve scales and then, with one unperforated scale intervening, continues to the root of the caudal with thirty-seven perforated scales. In the transverse series there are three rows of scales above the anterior twelve perforated scales and seven rows below this and above the mid-ventral line. In the posterior portion of the lateral line there are four transverse rows above and five and half rows below. There are twenty scales in the mid-ventral line between the posterior end of the gular plate and the vent.

Measurements in hundredths of total length without caudal fin :—

Depth of body	...	...	...	15
Depth of caudal peduncle	...	...	...	10.3
Length of head	...	...	...	26.4
Depth of head	...	...	...	13.2
Width of head	...	...	...	18.8
Length of snout	...	...	...	4.7
Diameter of orbit	...	...	...	4.7
Width of interorbital space	...	...	...	9.4
Distance from tip of snout to anterior root of dorsal fin	...	...	...	35
Height of longest dorsal rays	...	...	...	12.2
Distance from tip of snout to root of pectoral fin	...	...	...	28.3
Length of pectoral fin	...	...	...	17
Distance from tip of snout to vent	...	...	...	49
Distance from tip of snout to anterior root of anal fin	...	...	...	50.94
Height of longest anal rays	...	...	...	11.3

Length of caudal peduncle	...	...	10.38
Width of caudal peduncle	...	...	3.8
Length of longest rays of caudal fin	...	...	17
Height of root of caudal fin	...	...	8.5
Total length without caudal fin in mm.	...	...	106

The colour of the head and of the sides is dark brown; the ventral surface is dull white. In the young there are transversely oblique stripes of a deeper shade on the light brown or grey colour on the sides of the body. The pectoral fin is alternately variegated in bright white and black broad bands with an annular white zone round the black root of the fin; the caudal fin is alternately banded in white and black in their transverse stripes. There is no ocellus in the upper corner of the root of the caudal fin; the extreme ends of all the rays of the dorsal and anal fins are tipped with pure white.

This is the first time that any fish belonging to the genus *Channa* is reported from the Indian continent. The only species hitherto known from the Indian Region is *Channa orientalis*, Bloch and Schneider,¹ which is found in Ceylon and China. Two other names in the same genus (*C. ocellata*, Peters² and *C. formosana*, Jordan and Evermann³) are in all probability synonyms of one another and priority decides for *C. ocellata*. *Ophicephalus apus*, Canestrini,⁴ is in reality a *Channa* and differs very little from *C. orientalis*. *Channa burmanica* differs widely from these two hitherto known species in proportions, in the number of rays in the fins, in the arrangement and number of scales in the lateral line and other parts, as well as in colouration.

There are altogether four specimens in the collection, two of which, measuring 106 mm. and 79 mm. in length, are from the bed of the Sen-Bin-Ti, which further down becomes the Nam-Ti-Sang; the other two measure 45 mm. and 43 mm. in length; one is from a hill stream in the Putao Plains (Hkamti Long). The larger of these two is very much damaged. The specimen 106 mm. long from the river Sen-Bin-Ti is the holotype, and is entered in the register of the Zoological Survey of India under No. F 9755/1.

Genus *Badis*, Bleeker.

Badis badis (Hamilton Buchanan).

1822. *Labrus badis*, Hamilton Buchanan, *Acct. Fish. Ganges*, pp. 70 and 368, pl. xxv, fig. 23.
 1853. *Badis bucharani*, Bleeker, *Verh. Bat. Gen.*, XXV, p. 106, pl. ii, fig. 3.
 1861. *Badis bucharani*, Günther, *Cat. Fish. Brit. Mus.*, III, p. 367.
 1875. *Badis bucharani*, Day, *Fish. Ind.*, p. 128, pl. xxxi, fig. 6.
 1876. *Badis bucharani*, Bleeker, *Arch. Neerl. Sc. Nat.*, XI, p. 318.
 1877. *Galpuri* (*Labrus badis*), Hamilton Buchanan, *Stat. Acct. Bengal* XX, p. 40.

¹ Bloch and Schneider, *Syst. Ich.*, p. 496, pl. xc, fig. 2 (1801).

² Peters, *Monat. Preuss. Akad. Wissen. Berlin*, 1864, p. 392 (1865).

³ Jordan and Evermann, *Proc. U.S. Nat. Mus.*, XXV, pp. 316, 331 and 332, fig. 11 (1903).

⁴ Canestrini, *Archiv. Zool. Anat. Fisiol. Genova*, I, p. 77, pl. iv, fig. 7 (1861).

1877. *Dhalo* (*Labrus badis*), *Id.*, *ibid.*, pp. 87 and 97.
1889. *Badis buchanani*, Day, *Faun. Brit. Ind. Fish*, II, p. 80, fig. 38.
1890. *Badis buchanani*, Vinciguerra, *Ann. Mus. Civic. Stor. Nat. Genova*
(ser. 2), IX, p. 166.
1912. *Badis badis*, Sewell and Chaudhuri, *Ind. Fish. Prov. Util.*, p. 12,
fig. 6.
1913. *Badis badis*, Chaudhuri, *Rec. Ind. Mus.*, VIII, p. 256.

There are only three specimens in the collection, two of which are damaged. Their lengths without the caudal fin are 25, 26 and 29 mm. They were collected from hill streams in the Putao Plains.

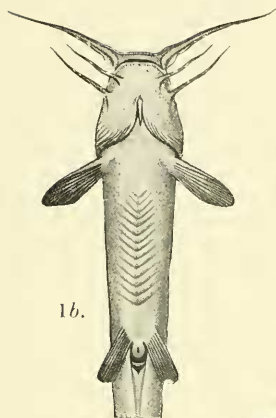
Distribution.—Fresh water of the hills and plains of India and Burma.

EXPLANATION OF PLATE XXII.

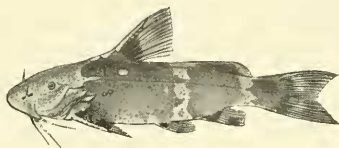
- FIG. 1.—*Amblyiceps murray-stuarti*, Chaudhuri, sp. nov.
 „ 1a. „ „ dorsal view of head.
 „ 1b. „ „ ventral view of body.
 „ 2.—*Erethistes asperus* (M'Clelland).
 „ 2a. „ „ ventral view of head and body.
 „ 2b. „ „ upper and lower jaws, $\times 4$.
 „ 3.—*Semiplotus cirrhosus*, Chaudhuri, sp. nov.
 „ 3a. „ „ ventral view of head and
 chest, $\times 2$.
 „ 4.—*Channa burmanica*, Chaudhuri, sp. nov., $\times \frac{2}{3}$.
 „ 4a. „ „ dorsal view of head, $\times \frac{2}{3}$.
 „ 4b. „ „ ventral view of head and body,
 $\times \frac{2}{3}$.



1.



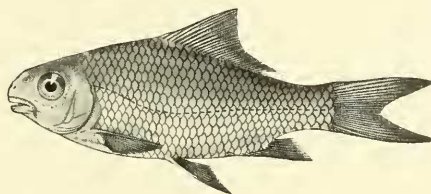
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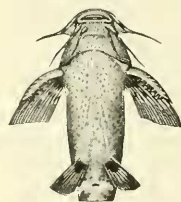
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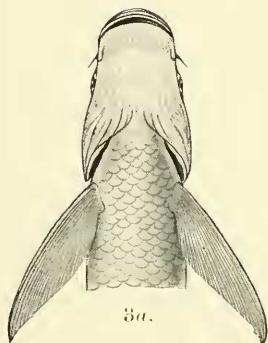
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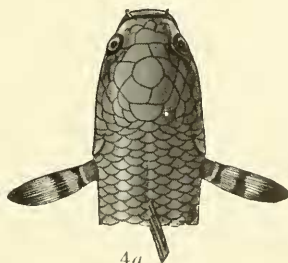
3.



2a.



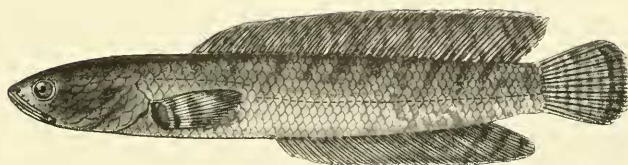
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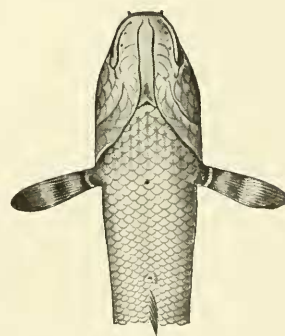
4a.



2b.



4.



4b.

FISH FROM PUTAO (HKANTI LONG).